Appendix F:

Traffic Operations Analysis

HEXAGON TRANSPORTATION CONSULTANTS, INC.

Memorandum

To: Joseph Dyke, City of San Jose

Cc: Shannon George, David J. Powers & Associates, Inc.

From: Robert Del Rio, T.E.
Huy Tran, T.E.

Date: January 16, 2017

Subject: South 2nd Street Student Housing Development Traffic Operations Analysis

Introduction

Hexagon Transportation Consultants, Inc. has completed a traffic operations analysis for the proposed South 2nd Street Student Housing Development in Downtown San Jose. The site includes parcels at 300 S. 2nd Street and 80/90 East San Carlos Street situated on the south side of East San Carlos Street between 2nd Street and 3rd Street. The project proposes to construct up to 260 student housing units and 17,190 square feet (s.f.) of ground-floor retail space within a 19-story tower. Parking for the project will be provided within a four-level parking garage accessed via a left-turn only driveway located along S. 2nd Street. The parking garage will include 265 parking spaces, 71 motorcycle parking spaces, and space for storage of 400 bicycles. The project site had included an office building and a fast-food restaurant on site that will be demolished as part of the project. Figure 1 shows the project site location.

Since the project site is located in the Downtown Core area boundary, it is covered under the San Jose Downtown Strategy 2000 EIR. Accordingly, City staff has already concluded that the project is in conformance with the City of San Jose Transportation Level of Service Policy (Council Policy 5-3) and will not require preparation of a comprehensive Transportation Impact Analysis (TIA). The Public Works department has indicated, however, that a traffic operations analysis is required in order to identify potential operational issues that could occur as a result of the proposed project. This traffic analysis is intended to satisfy the City's request.

Scope of Study

The purpose of the traffic operations study was to identify any potential operational issues that could occur as a result of the project and to recommend necessary improvements to ensure adequate access to the site is provided. Based on the proposed project size, site-generated traffic was estimated. Vehicular site access was evaluated based on the proposed driveway location. Truck access, including trash pickup and loading activities, was evaluated. Parking and on-site vehicular circulation also was analyzed. Lastly, bicycle and pedestrian access and safety were evaluated.

Existing Conditions

This section describes the existing conditions for all of the major transportation facilities in the vicinity of the site, including the roadway network, transit service, and bicycle and pedestrian facilities.

Existing Roadway Network

Regional access to the project site is provided by I-280. Local site access is provided by S. 2nd Street, S. 3rd Street, E. San Salvador Street, and E. San Carlos Street. The I-280 freeway and local roadways are described below.

Figure 1
Site Location, Study Intersections, Project Trip Distributions, and Project Trip Assignments

I-280 is an eight-lane freeway in the vicinity of the site. It extends northwest to San Francisco and east to King Road in San Jose, at which point it makes a transition into I-680 to Oakland. Access to and from the site is provided via its ramps at S. 1st, S. 4th, S. 6th and S. 7th Streets.

S. 3rd Street is a two-lane one-way street with a buffered bike lane serving travel in the northbound direction. S. 3rd Street runs along the eastern project frontage and provides access to the project site via E. San Carlos Street to S. 2nd Street.

S. 2nd Street is a two-lane one-way street with a buffered bike lane serving travel in the southbound direction. S. 2nd Street runs along the western project frontage and provides direct access to the project site via a left-turn only driveway.

E. San Salvador Street is an east-west two-lane street that provides shared bike lanes. E. San Salvador Street provides access from the project site via S. 2nd Street.

San Carlos Street is an east-west four-lane street that runs along the project's northern frontage. It extends as West San Carlos Street from 1st Street westward to Bascom Avenue where it transitions into Stevens Creek Boulevard. East of 1st Street, it extends eastward as East San Carlos Street with a break between 4th and 10th Streets (at San Jose State University) and terminating at 17th Street. Between 2nd Street and Woz Way, the VTA light rail tracks run along the middle of the street, separating the eastbound and westbound travel lanes.

Existing Bicycle and Pedestrian Facilities

Pedestrian facilities in the study area consist mostly of sidewalks along all of the surrounding streets, including the project frontages along E. San Carlos Street, S. 2nd Street, and S. 3rd Street. Crosswalks with pedestrian signal heads are located at all signalized intersections within the project area including the intersections of S. 2nd and S. 3rd Streets with E. San Carlos Street. Overall, the existing sidewalks have good connectivity and provide pedestrians with safe routes to the surrounding land uses in the area, including San Jose State University (SJSU). In addition, Bike Share and Zipcar locations are provided throughout the downtown area. The nearest Bike Share and Zipcar locations are located within walking distance, north of the project site at the intersection of S. 4th Street and E. San Carlos Street, and S. 3rd Street and Paseo De San Antonio Walk, respectively.

A pedestrian walkway (Paseo de San Antonio) is located north of the project site, between E. San Fernando Street and E. San Carlos Street. The paseo serves as a cut-through for pedestrians and bicyclist only between SJSU and Plaza de Cesar Chavez Park and provides access to shops and business along the walkway.

Class II bicycle facilities (striped bike lanes) are provided on S. 2nd Street, south of San Salvador Street, S. 3rd Street, and S. 4th Street. E. San Carlos Street and S. 2nd Street, along the project frontages, do not provide Class II bicycle facilities. However, E. San Carlos Street, between 4th Street and Woz Way, and 2nd Street, north of San Salvador Street, are designated Class III bike paths and provide "sharrow" or shared-lane markings. In addition, the extent of San Salvador Street, S. 1st Street and S. 2nd Street, north of San Salvador Street, are designated class III bike paths and provide "sharrow" or shared lane markings.

Guadalupe River Park Trail

The Guadalupe River multi-use trail system runs through the City of San Jose along the Guadalupe River and is shared between pedestrians and bicyclists and separated from motor vehicle traffic. The Guadalupe River trail is an 11-mile continuous Class I bikeway from Curtner Avenue in the south to Alviso in the north. This trail system can be accessed via W. San Carlos Street and S. Almaden Boulevard just ½ mile west of the project site.

Bay Area Bike Share

The City of San Jose participates in the Bay Area Bike Share program that allows users to rent and return bicycles at various locations. Bike share bikes can only be rented and returned at designated stations throughout the downtown area. The nearest bike share station is located less than 500 feet from the project site at the intersection of S. 4th Street at E. San Carlos Street.

Zipcar

Zipcar provides vehicles to individuals for hourly or daily use. This program places vehicles at designated Zipcar locations throughout the downtown area for use by individuals who have Zipcar accounts. This car sharing service allows drivers' access to an automobile without the need to own their own. The nearest Zipcar station is located less than 500 feet the project site near S. 3rd Street and Paseo De San Antonio Walk. Figure 2 shows the existing bicycle facilities and Zipcar stations in the project vicinity.

Existing Transit Services

Existing transit services in the study area are provided by the VTA, Caltrain, Altamont Commuter Express (ACE), and Amtrak. Figure 3 shows the existing transit facilities.

Bus Service

The downtown area is served by many local bus lines. The bus lines that runs along the project frontages on S. 2nd Street and E. San Carlos Street are listed in Table 1, including their route descriptions and commute hour headways. The nearest bus stops are located adjacent to the north west corner of the project site at the intersection of S. 2nd Street and E. San Carlos Street.

The VTA also provides a shuttle service within the downtown area. The downtown area shuttle (DASH) provides shuttle service from the San Jose Diridon Caltrain station to San Jose State University, and the Paseo De San Antonio and Convention Center LRT stations via E. San Fernando and E. San Carlos Streets.

VTA Light Rail Transit (LRT) Service

The Santa Clara Valley Transportation Authority (VTA) currently operates the 42.2-mile VTA light rail line system extending from south San Jose through downtown to the northern areas of San Jose, Santa Clara, Milpitas, Mountain View and Sunnyvale. The service operates nearly 24-hours a day with 15-minute headways during much of the day. The Mountain View–Winchester and Alum Rock–Santa Teresa LRT lines operate along 1st and 2nd Streets, north of San Carlos Street. The San Antonio LRT Stations on both 1st and 2nd Streets are located within walking distance, less than 1,000 feet, of the project site. The San Jose Diridon station is located along the Mountain View–Winchester LRT line and is served by Caltrain, ACE, and Amtrak.

Caltrain Service

Commuter rail service between San Francisco and Gilroy is provided by Caltrain, which currently operates 92 weekday trains that carry approximately 47,000 riders on an average weekday. The project site is located about 1½-mile from the San Jose Diridon station. The Diridon station provides 581 parking spaces, as well as 18 bike racks and 48 bike lockers. Trains stop frequently at the Diridon station between 4:30 AM and 10:30 PM in the northbound direction, and between 6:28 AM and 1:34 AM in the southbound direction. Caltrain provides passenger train service seven days a week, and provides extended service to Morgan Hill and Gilroy during commute hours.

Altamont Commuter Express Service

ACE provides commuter rail service between Stockton, Tracy, Pleasanton, and San Jose during commute hours, Monday through Friday. Service is limited to four westbound trips in the morning and four eastbound trips in the afternoon/ evening with headways averaging 60 minutes. ACE trains stop at the Diridon Station between 6:32 AM and 9:17 AM in the westbound direction, and between 3:35 PM and 6:38 PM in the eastbound direction.

Amtrak Service

Amtrak provides daily commuter passenger train service along the 170-mile Capitol Corridor between the Sacramento region and the Bay Area, with stops in San Jose, Santa Clara, Fremont, Hayward, Oakland,

Figure 2
Existing Bicycle Facilities and Zipcar Locations

Figure 3
Existing Transit Facilities

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Table 1
Existing Bus Service Near the Project Site

Bus Route	Route Description	Headway /a/
Local Route 23	DeAnza College to Alum Rock Transit Center via Stevens Creek	12 min
Local Route 66	Kaiser San Jose Medical Center to Dixon Landing Road (Milpitas)	15 min
Local Route 68	Gilroy Transit Center to San Jose Diridon Station	15-20 min
Local Route 82	Westgate to Downtown San Jose	30 min
Express Route 168	Gilroy Transit Center to San Jose Diridon Station	30 min
Limited Stop Route 304	Santa Teresa LRT Station to Sunnyvale Transit Center	30 min
Limited Stop Route 323	Downtown San Jose to De Anza College	15 min

Notes:
/a/ Approximate headways during peak commute periods.

Emeryville, Berkeley, Richmond, Martinez, Suisun City, Davis, Sacramento, Roseville, Rocklin, and Auburn. The Capitol Corridor trains stop at the San Jose Diridon Station eight times during the weekdays between approximately 7:38 AM and 11:55 PM in the westbound direction. In the eastbound direction, Amtrak stops at the Diridon Station seven times during the weekdays between 6:40 AM and 7:15 PM.

Project Trip Generation

Through empirical research, data have been collected that quantify the amount of traffic produced by common land uses. Thus, for the most common land uses there are standard trip generation rates that can be applied to help predict the future traffic increases that would result from a new development. The magnitude of traffic added to the roadway system by a particular development is estimated by multiplying the applicable trip generation rates by the size of the development. The trip generation rates contained in the San Jose TIA Handbook, November 2009 and the Urban Infill Land Uses in California report prepared by Kimley-Horn and Associates, Inc. (June 15, 2009) were used for this study.

The apartment rates provided in the Urban Infill Land Uses in California report are based on counts at sites characterized by mixed land uses and high rise buildings that are typical of downtown areas and create opportunities for multi-modal travel and strong transit demand.

The trip estimates for the retail component of the proposed project were reduced to account for internalization, or trips made between the proposed residential and retail land uses. The VTA's *Transportation Impact Analysis Guidelines*, October 2014 recommends a 15% trip reduction for internalization between housing and retail components. In addition, trip generation for retail uses is typically adjusted to account for pass-by-trips. Pass-by-trips are trips that would already be on the adjacent roadways (and are therefore already counted in the existing traffic) but would turn into the site while passing by. Justification for applying the pass-by-trip reduction is founded on the observation that such retail traffic is not actually generated by the retail development, but is already part of the ambient traffic levels. Pass-by-trips are therefore excluded from the traffic projections (although pass-by traffic is accounted for at the site entrances). A typical pass-by trip reduction of 25% for retail development within Santa Clara County was applied to the retail component of the existing and proposed land uses.

Based on the applicable rates and trip reductions, it is estimated that the proposed project will generate a total of 37 AM peak hour trips and 69 PM peak hour trips. The trip generation estimates for the proposed project are shown in Table 2.

Table 2
Project Trip Generation Estimates

		AM Peak Hour						PM Peak Hour					
		Pk-Hr	Split		Trip			Pk-Hr	Split		Trip		
Land Use	Size	Rate	In	Out	In	Out	Total	Rate	In	Out	In	Out	Total
Proposed Land Uses													
Apartment[2]	260	0.07	16%	84%	3	15	18	0.10	66%	34%	17	9	26
Retail[1]	17,190	1.22	70%	30%	15	6	21	3.61	50%	50%	31	31	62
Internalization Reduction (15%)[3]					-2	0	-2				-1	-3	-4
Passby Reduction (25%)[4]					0	0	0				-8	-7	-15
Total Gross Project Trips					**16**	**21**	**37**				**39**	**30**	**69**

Notes:
[1]Based on trip rates for "Specialty Retail/Strip Commercial" contained in the San Jose TIA Handbook, November 2009.
[2]Peak-hour rate and directional split were calculated using the weighted average of the counts from the high-rise apartments located at 1390 Market Street in San Francisco and the high-rise condos/townhouses located at 606 Front Street in San Diego from the Trip Generation Rates for Urban Infill Land Uses in California by Kimley-Horn and Associates, Inc. (June 15, 2009). Weighted average is computed by dividing the total number of trips by the total number of units.
[3]As prescribed by the Transportation Impact Analysis Guidelines from VTA (October 2014), the maximum trip reduction for mixed-use development project with housing and retail is equal to 15% off the smaller trip generator.
[4]A 25% PM pass-by reduction is typically applied for retail development within Santa Clara County.

It also is important to note that the project is intended to serve as student (San Jose State University SJSU) housing. The availability of bicycle lanes and sidewalks throughout downtown and the project's close proximity to major transit services and SJSU will provide for and encourage the use of multi-modal travel options (bicycling and walking) and reduce the use of single-occupant automobile travel. Therefore, the estimates of trips to be generated by the proposed project as presented and evaluated within this study may represent an over-estimation of traffic and impacts associated with the proposed project. It is expected that the auto trips ultimately generated by the project will be less and the identified operational issues reduced with the use of the multi-modal transportation system within the Downtown area.

Project Trip Distribution and Trip Assignment

The trip distribution pattern for the project was based on previous traffic studies prepared for similar projects in downtown San Jose. The project trips were assigned to the roadway network based on the proposed project driveway location, existing travel patterns in the area, freeway access, and the relative locations of complementary land uses. The project trip distribution patterns and trip assignment are shown on Figure 1.

Vehicular Site Access and Circulation

A review of the project site plans was performed to determine if adequate site access and on-site circulation is provided and to identify any access issues that should be improved. This review is based on the site plans dated July 13, 2016 prepared by Barry Swenson Builder, and in accordance with generally accepted traffic engineering standards and City of San Jose requirements. The street level site plan is shown on Figure 4.

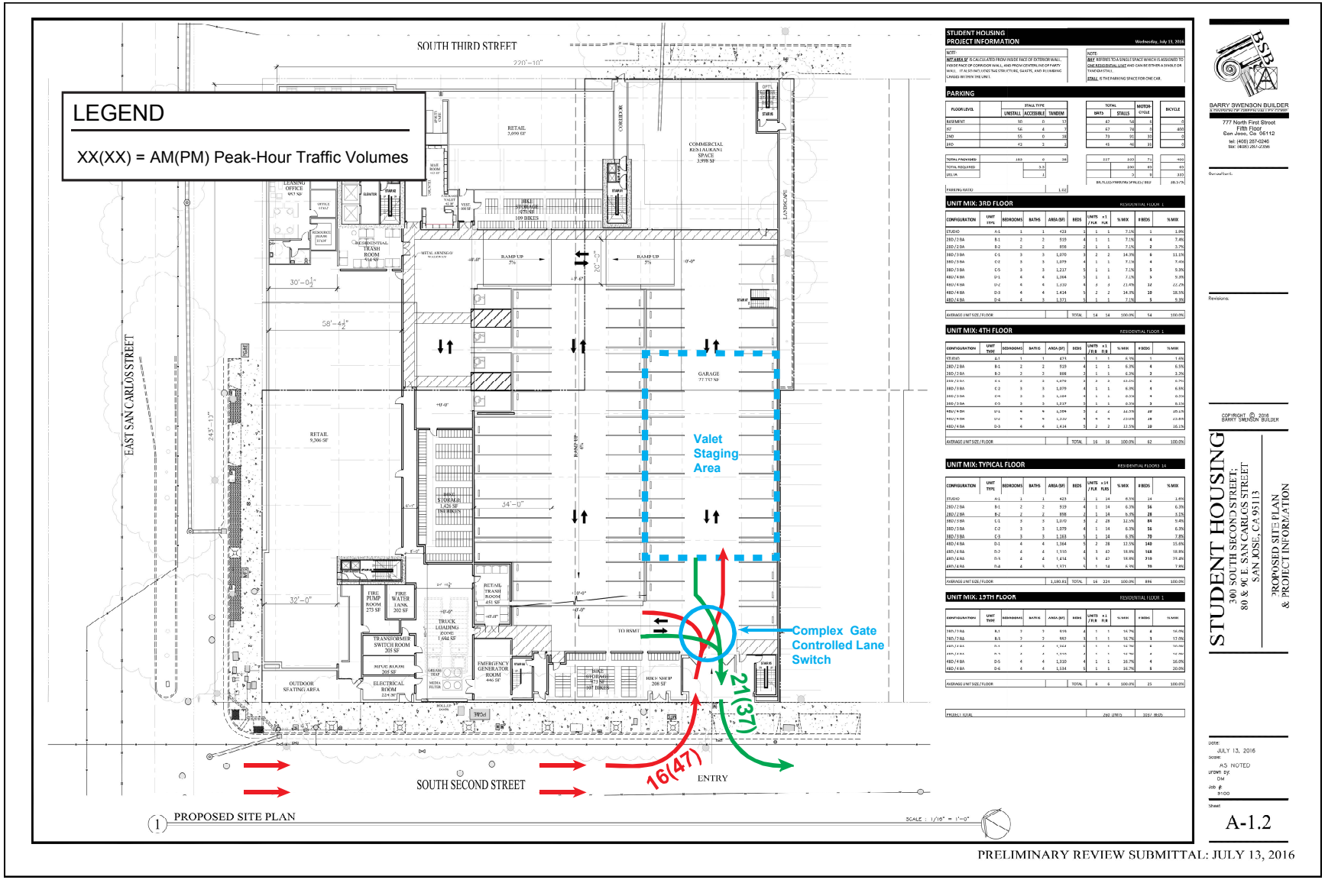
Project Driveway and Drive Aisles

The project proposes one left-turn only access entrance to the on-site parking garage located approximately 200 feet south of the S. 2nd Street and E. San Carlos signalized intersection. One loading bay driveway, that will accommodate two large trucks, will also be located approximately 100 feet north of the parking garage entrance.

The City of San Jose Municipal Code Section 20.90.100 requires a minimum width of 26 feet for driveways and drive aisles with 90-degree parking that serve two-way traffic. The site plan indicates that the width of project driveway and drive aisles are proposed to be 24 feet wide, which is less than the City's requirement of 26 feet. The project driveway will be required to be a minimum of 26 feet.

In addition, the City typically requires parking garage entrances to be located at least 50 feet from the face of the curb in order to provide adequate stacking space for at least two inbound vehicles. This requirement, however, may not always be achievable in the downtown area due to the zero setback requirements for buildings located in downtown. It is recommended that the proposed garage entrance gates be located a minimum of one car length back from the sidewalk (within the parking garage) to be

Figure 4
Ground Level Site Plan



able to accommodate one entering vehicle at the garage entrance gates without blocking the sidewalk on S. 2nd Street. Based on the estimated trip generation, a maximum of 47 inbound trips would need to be served at the project entrance in a single hour (PM Peak Hour), or approximately one vehicle per minute. Therefore, queuing at the garage entrance along 2nd Street should be minimal and providing storage for one vehicle at the parking garage entrance should be adequate.

Sight Distance at the Driveway Serving the Project

The driveways serving the project should be free and clear of obstructions, thereby ensuring that all exiting vehicles can see pedestrians on the sidewalk and vehicles travelling on S. 2nd Street. Adequate sight distance (sight distance triangles) should be provided at the driveway in accordance with Caltrans standards. Sight distance triangles should be measured approximately 10 feet back from the travelled way. Appropriate visible and/or audible warning signals should be provided at the project driveways to alert pedestrians and bicyclists of vehicles exiting the parking garages.

Providing appropriate sight distance reduces the likelihood of a collision at a driveway or intersection and provides drivers with the ability to exit a driveway or locate sufficient gaps in traffic. Sight distance generally should be provided in accordance with Caltrans standards. The minimum acceptable sight distance is often considered the Caltrans stopping sight distance. Sight distance requirements vary depending on the roadway speeds. For the project driveway on S. 2nd Street, which has a speed limit of 20 miles per hour (mph), the Caltrans stopping sight distance is 125 feet for design speeds of 20 mph. Thus, a driver must be able to see 125 feet north on S. 2nd Street when turning out of the project driveway to avoid a collision. The proposed project will have a left-turn only access driveway and two loading docks located approximately 200 feet and 75 feet, south of the S. 2nd Street and E. San Carlos signalized intersection, respectively. Minimum sight distance from the proposed driveway location to the north (towards the S. 2nd Street and E. San Carlos intersection) would be met if the posted speed limit of 20 mph is in compliance. However, given the loading dock location, it is not possible to meet the Caltrans sight distance standards at the loading dock driveway for turn movements from E. San Carlos Street to S. 2nd Street. However, with implementation of the time restricted use of the loading dock, as previously discussed, and the signal at E. San Carlos Street, sufficient gaps in traffic flow along S. 2nd Street should be provided to allow vehicles to enter and exit the loading dock.

Vehicular On-Site Circulation

The City's standard width for two-way drive aisles is 26 feet wide where 90-degree parking is provided. This allows sufficient room for vehicles to back out of parking spaces. The site plan indicates that the drive aisles will be 20 feet or 24 feet. It is recommended that the drive aisles on each level be designed to meet the City's standard 26 feet wide requirement.

The 2nd Street driveway will provide the only access to parking garage. Vehicles will enter at the driveway and either make a left-turn to proceed down to the basement parking level or continue straight to circulate through the three levels of above grade ramped parking levels. With the exception of the third parking level, circulation through each of the levels of the parking garage will be in a continuous counter-clockwise rectangular loop. The third parking level includes a dead-end drive aisle. Drivers circulating through the parking levels will be unable to complete a simple turn around when confronting the dead-end. However, the parking garage will be restricted to the use of residents only with assigned parking. Therefore, given that residents will be familiar with the parking garage and will not be circulating the garage in search of available parking, the dead-end drive aisles should not be problematic.

In addition, the first parking level includes a ramp and drive aisle to access designated accessible parking spaces and one of three bike storage facilities. It is recommended that signage restricting the use of the ramp to bicycle and accessible parking be placed at the ramp entrance.

Reversed Lanes at Garage Entrance

The City has recommended that the inbound/outbound lane orientation at the driveway serving the on-site parking garage be reversed to reduce delays with the one-way operations on S. 2nd Street. With the lane reversal at the site driveway, inbound vehicles would enter the driveway on the north side of the driveway, while the outbound would exit on the south side. The lane reversal also will reduce delays and conflicts of vehicles entering and exiting the garage.

However, accommodation of the reversed lanes at the parking garage entrance is problematic due to the garage design and conventional circulation through the two-way drive aisle ramp parking decks within the parking garage. The garage design would require a significant redesign to provide one-way drive aisles to accommodate the reversed lanes within the garage. Alternatively, the reversed lanes at the driveway would require that the inbound and outbound lanes be switched to conventional circulation at some point within the garage to work with the proposed garage design. The lane switch would need to occur at a point near the entrance and require complex gate control (see Figure 4). Gate control could result in delays at the entrance and may result in inbound vehicles extending back onto 2nd Street. Instead, it is recommended that a valet style service be provided should the reversed lanes at the parking garage entrance be implemented. The parking garage will be restricted to residents only which are expected to be college students. The valet service would require a parking staging area in which drivers would enter the garage and park. The valet service would then park the vehicle allowing maintenance of the proposed conventional two-way circulation within the garage. Upon exit residents would request that their vehicle be brought to the staging area.

Truck Access and Circulation

Based on the City of San Jose off-street loading standard for developments in the Downtown Area, the project is required to provide three off-street loading spaces for the residential component and one off-street loading space for the retail component. The project, as shown in the provided site plan, proposes an off-street loading area that will accommodate two large trucks with access off of 2nd Street. The project requires two additional loading spaces to meet the City requirements. As per section 20.70.450 of the Downtown Zoning Regulations, the Planning Director may authorize the reduction of two on-site loading spaces to one on-site loading space in connection with the issuance of a development permit if the Director finds that sufficient on-street loading space exists to accommodate circulation and manipulation of freight. It is recommended that the project pursue this reduction in off-street loading spaces by providing at least two on-street loading spaces. The City will evaluate the location of on-street loading spaces for general deliveries, such as FedEx or UPS trucks on either E. San Carlos Street or 3rd Street during the implementation stage of the project. It is recommended that the on-street loading zone be time-restricted and located a minimum of 20 feet from crosswalks along E. San Carlos Street and may require the removal of on-street parking. The project should work with City Staff to ensure that all loading spaces provided meet City standards for height and width, and do not interfere with vehicular traffic on the street.

The use of the loading/delivery area along 2nd Street by large trucks that back into the entrance will be problematic due to the large volume of vehicles travelling southbound along 2nd Street during the peak periods. The use of the truck loading dock driveway on 2nd Street by large trucks that must back into the entrance for loading/unloading should be restricted to the hours between 9:30 AM and 3:30 PM, and, if necessary, between 6:30 PM and 6:30 AM so as not to impede traffic flow along 2nd Street during the peak commute.

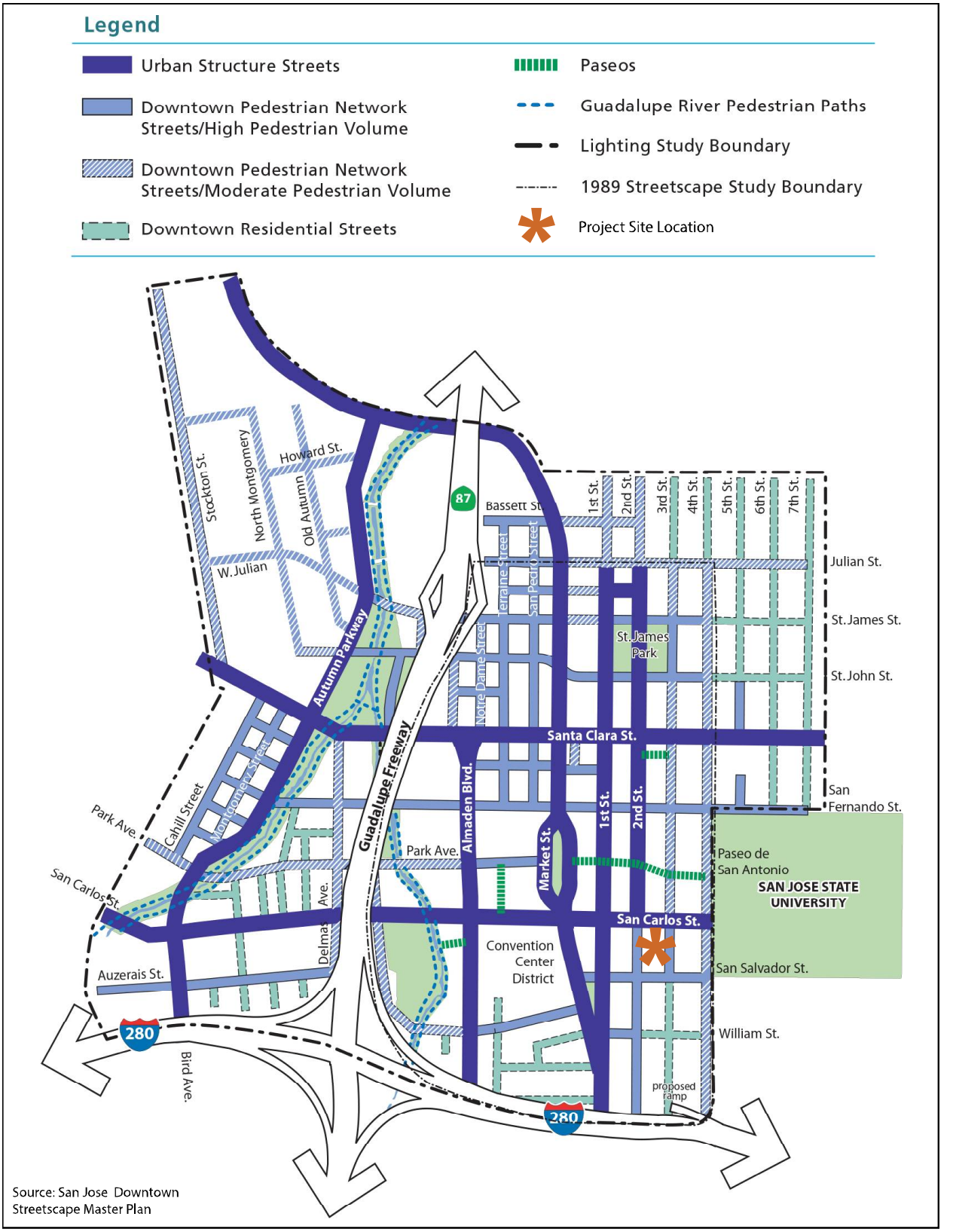
The site plan indicates that a trash enclosure will be located on street level near the northeast corner of the building. Though the site plan does not indicate the interior first floor height, it is unlikely that garbage trucks would be able to enter the site. Therefore, it is presumed that trash bins will be wheeled out to S. 2nd Street though the loading/delivery area for garbage truck pickup. It is recommended that the use of the loading/delivery area be restricted during scheduled garbage pick-up times to ensure that access by garbage trucks is not inhibited.

Pedestrian and Bicycle Access and Circulation

Pedestrian and Bicycle Circulation

The Downtown Streetscape Master Plan (DSMP) provides design guidelines for existing and future development for the purpose of enhancing the pedestrian experience in the Greater Downtown Area. Per the DSMP and shown in Figure 5, both S. 2nd and S. 3rd Streets, south of E. San Carlos Street, are designated Downtown Pedestrian Network Streets (DPNS), which are intended to support a high level of pedestrian activity as well as retail and transit connections. The DPNS streets provide a seamless network throughout the downtown that is safe and comfortable for pedestrians and connects all major downtown destinations. Design features of a DPNS create an attractive and safe pedestrian environment to promote walking as the primary travel mode. The DSMP policies state that vehicles crossing the sidewalk are often a safety hazard

Figure 5
Downtown Pedestrian Street Network



Source: San Jose Downtown Streetscape Master Plan

for pedestrians and measures should be taken within the design for any new project to minimize the number of curb cuts and driveways.

Sidewalks are provided along the project's frontages on S. 2nd Street, S. 3rd Street, and E. San Carlos Street. The project will be constructing 15' sidewalks attached sidewalks along all project frontages. High visibility crosswalks and pedestrian signal heads are available at the adjacent intersections of S. 2nd Street and S. 3rd Street with E. San Carlos Street. In addition, Bike Share and Zipcar locations are located within walking distance, north of the project site at the intersection of S. 4th Street and E. San Carlos Street, and S. 3rd Street and Paseo De San Antonio Walk, respectively. Overall, the existing pedestrian facilities have good connectivity and provide residents with a safe connection between the project site and surrounding land uses, including SJSU, and transit facilities.

The project site is served by various existing bicycle facilities including Class II bicycle facilities with buffered bike lanes on S. 2nd Street, south of E. San Salvador Street, S. 3rd Street (project frontage), and S. 4th Street. E. San Carlos Street, between 4th Street and Woz Way, and 2nd Street, north of San Salvador Street, are designated Class III bike paths and provide "sharrow" or shared-lane markings. Additionally, the Guadalupe River Park Trail, a Class I pedestrian and bicycle trail, is accessible via W. San Carlos Street and S. Almaden Boulevard just ½ mile west of the project site.

Transit Facilities

The project is in close proximity to major transit services that will provide the opportunity for multi-modal travel to and from the project site. The San Antonio LRT stations along both 1st and 2nd Streets are located within walking distance, less than 1,000 feet, of the project site. In addition, the San Jose Diridon Station is located along the Mountain View–Winchester LRT line and is served by Caltrain, ACE, and Amtrak. The pedestrian and bicycle facilities located along streets adjacent to the project site provide access to major transit stations and provide for a balanced transportation system as outline in the Envision 2040 General Plan goals and policies.

Parking

It should be noted that the project is intended to serve as student (San Jose State University SJSU) housing. In addition, projects in the downtown area are located in close proximity to offices, recreation, and retail services, allowing individuals to satisfy their daily needs for work or shop near their place of residence. The availability of bicycle lanes and sidewalks throughout downtown and the project's close proximity to major transit services and SJSU will provide for and encourage the use of multi-modal travel options (bicycling and walking) and reduce the use of single-occupant automobile travel and demand for on-site parking described below.

According to the City of San Jose Downtown Zoning Regulations, the project is required to provide one off-street parking space per residential unit. The project is not required to provide additional off-street parking for the retail component of the project. Based on the City's off-street parking requirements, the project is required to provide a total of 260 off-street parking spaces.

The project proposes a total of 265 on-site parking stalls: 54 basement level spaces, 74 street level spaces, 91 second level spaces, and 46 third level spaces. Based on the standard City of San Jose Downtown parking requirements, the on-site parking would be adequate to serve the project.

Tandem parking is being proposed within all parking garage levels. In order to guarantee effective use of the tandem parking spaces, all of the tandem spaces should be assigned parking. If assigned, the tandem spaces would not be expected to create any parking related issues. In the City of San Jose, the Planning Director may issue a development permit to allow tandem parking spaces to satisfy up to 50 percent of the off-street parking requirement for a project.

Bicycle Parking

Since the project is intended to house university students and will be located in close proximity to SJSU, it is likely that many residents of the proposed residential units will utilize bicycles rather than vehicles to travel to and from the campus. Therefore, the City will require the project to meet the City's Bicycle Parking

requirements. The City of San Jose Standards require 1 bicycle parking space per 4 living units and 1 bicycle parking space per 3,000 s.f. of retail floor areas. Bicycle parking spaces shall consist of at least sixty percent long-term and at most forty percent short-term spaces. Thus, the proposed project is required to provide a total of 71 bicycle parking spaces: 43 long-term bicycle parking spaces and 28 short-term bicycle parking spaces to meet the city standards.

Based on the site plan, the project is proposing space for the storage of 400 bicycles within three storage rooms. Therefore, the proposed on-site bicycle parking will exceed the City bicycle parking requirements and encourage the use of non-auto modes of travel and minimize the demand for on-site parking described above.

Vehicular Queuing Analysis

A vehicle queuing analysis was completed for high-demand movements at the study intersections. The study locations were selected based on the number of projected project trips at utilizing left-turning lanes at surrounding intersections. The project is expected to generate large left-turn volumes at only the San Carlos Street and 2nd Street intersection since the only project access point is provided along 2nd Street. The vehicle queuing analysis was estimated using a Poisson probability distribution, which estimates the probability of "n" vehicles for a vehicle movement using the following formula:

$$P(x=n) = \frac{\lambda^n e^{-(\lambda)}}{n!}$$

Where:

P (x=n) = probability of "n" vehicles in queue per lane
n = number of vehicles in the queue per lane
λ = average number of vehicles in the queue per lane (vehicles per hour per lane/signal cycles per hour)

The basis of the analysis is as follows: (1) the Poisson probability distribution is used to estimate the 95th percentile maximum number of queued vehicles per signal cycle for a particular movement; (2) the estimated maximum number of vehicles in the queue is translated into a queue length, assuming 25 feet per vehicle; and (3) the estimated maximum queue length is compared to the existing or planned available storage capacity for the movement. The results of the queue analysis are summarized in Table 3.

The queuing analysis indicates that the projected queues for the westbound left-turn pocket at the San Carlos Street and 2nd Street intersection currently exceed the available storage capacity during the PM peak hour. The westbound left-turn pocket currently provides approximately 100 feet of vehicle storage, which can accommodate approximately 4 vehicles. The estimated 95th percentile vehicle queue for the westbound left-turn movement is projected to be approximately 5 vehicles during the PM peak hour under background conditions. The addition of project traffic would lengthen the projected queues for the westbound left-turn movement by only one vehicle.

The westbound left-turn pocket at the intersection of San Carlos Street and 2nd Street could be extended an additional 50 feet to accommodate the projected queue. However, extending the existing westbound left-turn pocket would require partial removal of the landscaped center median and established trees along San Carlos Street. Therefore, the extension of the turn-pocket at the intersection is not recommended. The projects close proximity to major transit services and pedestrian and bicycle facilities along surrounding streets would provide for and encourage the use of multi-modal travel options and reduce the use of single-occupant automobile travel. It is expected that the auto trips ultimately generated by the project would be less than those estimated within this study and the identified operational deficiencies (queues at intersections) reduced as development and the planned enhancement of the multi-modal transportation system progresses within the downtown area.

Table 3
Queuing Analysis Summary for Westbound Left-turn at S. 2nd Street and E. San Carlos Street

Measurement	AM	PM
Existing Conditions		
Cycle/Delay[1] (sec)	66	100
Lanes	1	1
Volume (vph)	33	72
Volume (vphpl)	33	72
Avg. Queue (veh/ln.)	0.6	2.0
Avg. Queue[2] (ft./ln)	15	50
95th %. Queue (veh/ln.)	2	5
95th %. Queue (ft./ln)	50	125
Storage (ft./ ln.)	100	100
Adequate (Y/N)	YES	**NO**
Existing Plus Project Conditions		
Cycle/Delay[1] (sec)	66	100
Lanes	1	1
Volume (vph)	41	89
Volume (vphpl)	41	89
Avg. Queue (veh/ln.)	0.8	2.5
Avg. Queue[2] (ft./ln)	19	62
95th %. Queue (veh/ln.)	2	5
95th %. Queue (ft./ln)	50	125
Storage (ft./ ln.)	100	100
Adequate (Y/N)	YES	**NO**
Background Conditions		
Cycle/Delay[1] (sec)	66	100
Lanes	1	1
Volume (vph)	33	81
Volume (vphpl)	33	81
Avg. Queue (veh/ln.)	0.6	2.3
Avg. Queue[2] (ft./ln)	15	56
95th %. Queue (veh/ln.)	2	5
95th %. Queue (ft./ln)	50	125
Storage (ft./ ln.)	100	100
Adequate (Y/N)	YES	**NO**
Background Plus Project Conditions		
Cycle/Delay[1] (sec)	66	100
Lanes	1	1
Volume (vph)	41	99
Volume (vphpl)	41	99
Avg. Queue (veh/ln.)	0.8	2.8
Avg. Queue[2] (ft./ln)	19	69
95th %. Queue (veh/ln.)	2	6
95th %. Queue (ft./ln)	50	150
Storage (ft./ ln.)	100	100
Adequate (Y/N)	YES	**NO**

[1] Vehicle queue calculations based on cycle length for signalized intersections.
[2] Assumes 25 feet per vehicle queued

Conclusions

The project as proposed would consist of up to 260 student housing units and 17,190 square feet (s.f.) of ground-floor retail space within a 19-story tower. Parking for the project will be provided within a four-level parking garage accessed via a left-turn only driveway located along S. 2nd Street. The parking garage will include 265 parking spaces, 71 motorcycle parking spaces, and space for storage of 400 bicycles. The driveway would have a gated entrance into the parking garage. One loading bay driveway, that will accommodate two large trucks, will also be located approximately 100 feet north of the parking garage entrance.

Since the project site is located in the Downtown Core area boundary, it is covered by the San Jose Downtown Strategy 2000 EIR. Accordingly, City staff has already concluded that the project is in conformance with the City of San Jose Transportation Level of Service Policy (Council Policy 5-3) and will not require preparation of a comprehensive Transportation Impact Analysis (TIA).

The project is intended to serve as student (San Jose State University SJSU) housing. The availability of bicycle lanes and sidewalks throughout downtown and the project's close proximity to major transit services and SJSU will provide for and encourage the use of multi-modal travel options (bicycling and walking) and reduce the use of single-occupant automobile travel. Therefore, the estimates of trips to be generated by the proposed project as presented and evaluated within this study may represent an over-estimation of traffic and impacts associated with the proposed project. It is expected that the auto trips ultimately generated by the project will be less and the identified operational issues reduced with the use of the multi-modal transportation system within the Downtown area.

A summary of the site access and circulation review along with recommended adjustments is provided below.

Recommendations

- The project access driveway shall be 26 feet wide.
- The proposed garage entrance gates should be located a minimum of one car length back from the sidewalk (within the parking garage due to the zero setback requirements in the Downtown area) on S. 2nd Street to be able to accommodate one entering vehicle at the garage entrance gates without blocking the sidewalk.
- Restrict the use of the truck loading dock driveway on 2nd Street by large trucks that must back into the entrance for loading/unloading to the hours between 9:30 AM and 3:30 PM, and, if necessary, between 6:30 PM and 6:30 AM so as not to impede traffic flow along 2nd Street during the peak commute.
- 15' sidewalks will be constructed along the project frontages on E. San Carlos Street, S. 2nd Street and S. 3rd Street in order to provide pedestrian connections between proposed and existing pedestrian facilities, transit services and enhance pedestrian circulation within the project area.
- Coordinate with the Public Works and the Department of Transportation during the implementation stage to determine the appropriate location of a time-restricted loading zone on E. San Carlos Street or 3rd Street.
- The project should implement the following:
    - Appropriate visible and/or audible warning signals should be provided at the project driveway to alert pedestrians and bicyclists of vehicles exiting the garage.
    - Restrict the use of the on-site parking garage to residents only with assigned parking for the purpose of ensuring effective use of the tandem parking spaces and circulation within the parking garage.
    - Restrict the use of the ramp that provides access to the bicycle and accessible parking by implementing signage at the ramp entrance.

- Trash bins will be wheeled out to S. 2nd Street through the loading/delivery area for garbage truck pickup. The project should restrict the use of the loading/delivery area during scheduled garbage pick-up times to ensure that access by garbage trucks is not inhibited.